# APPENDIX B

# LOS PATH DATA CALCULATIONS

By appropriate substitutions and by converting d to miles and frequency in GHz as an inverse function of wavelength, the frequency path loss between two isotropic antennas becomes:

$$A = 96.6 + 20 \log_{10} F + 20 \log_{10} D \qquad \text{(B-1)}$$

where

A = free space attenuation between isotropics, in dB

F = frequency in GHz

D = path distance, in miles

Figure B-1 is a path data form. Utilization of the form, together with a numerical example, can be found in chapter 5.

**MICROWAVE PATH DATA CALCULATIONS**

| | | | | | |
|---|---|---|---|---|---|
| 1 | SITE | | | | |
| 2 | LATITUDE | | | | |
| 3 | LONGITUDE | | | | |
| 4 | ELEVATION Ft. | | | | |
| 5 | TOWER HEIGHT Ft. | | | | |
| 6 | TOWER TYPE | | | | |
| 7 | AZIMUTH FROM TRUE NORTH. | | | | |
| 8 | PATH LENGTH Mi. | | | | |
| 9 | PATH ATTENUATION dB | | | | |
| 10 | RIGID WAVEGUIDE Ft. | | | | |
| 11 | FLEXIBLE WAVEGUIDE Ft. | | | | |
| 12 | WAVEGUIDE LOSS dB | | | | |
| 13 | CONNECTOR LOSS dB | | | | |
| 14 | CIRCULATOR OR HYBRID LOSS dB | | | | |
| 15 | RADOME LOSS, TYPE* dB | | | | |
| 16 | NEAR FIELD LOSS dB | | | | |
| 17 | CLOSE COUPLING LOSS (DOUBLE PASS.) dB | | | | |
| 18 | TOTAL FIXED LOSSES dB | | | | |
| 19 | TOTAL LOSSES dB | | | | |
| 20 | PARABOLA HEIGHT Ft. | | | | |
| 21 | PARABOLA DIAMETER Ft. | | | | |
| 22 | REFLECTOR HEIGHT Ft. | | | | |
| 23 | REFLECTOR SIZE, TYPE Ft. | | | | |
| 24 | PARABOLA - REFLECTOR SEP. Ft. | | | | |
| 25 | NEAR FIELD GAIN dB | | | | |
| 26 | ANTENNA SYSTEM GAIN dB | | | | |
| 27 | TOTAL GAINS dB | | | | |
| 28 | NET PATH LOSS dB | | | | |
| 29 | TRANSMITTER POWER dBm | | | | |
| 30 | MED. RECEIVED POWER (± 2 dB) dBm | | | | |
| 31 | RECEIVER NOISE THRESHOLD dBm | | | | |
| 32 | THEORECTICAL RF C/N RATIO dB | | | | |
| 33 | FM IMP. THRESHOLD ( dBa) dBm | | | | |
| 34 | FADE MARGIN (To FM Imp. Thresh.) dB | | | | |
| 35 | RELIABILITY SPACING† % | | | | |
| 36 | POLARIZATION ‡ | | | | |
| 37 | PROFILE NUMBER | | | | |

‡ { V - Vertical, H - Horizontal

N - Non-Diversity, Q - Space And Frequency Diversity

† { F - Frequency Diversity, S - Space Diversity

* { U - Unheated, H Heated

(Reliability Figures Are For Rayleigh Distributed Fading Only)

CUSTOMER _____

PROJECT NO. _____ FREQUENCY _____

SYSTEM _____ EQUIPMENT _____

LOADING _____ dBm0 ( _____ CHANNELS OF _____ )

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Figure B-1. Microwave Path Calculation Sheet